

REMARKS

Claims 1 – 14 are pending in the present application. Applicants amend claims 1, 5 and 9. No new matter is added.

OBJECTION TO CLAIMS

Claims 1 – 4 and 9 – 14 are objected in regard to certain claim limitation language associated with independent claims 1 and 9. Specifically, the Examiner suggests that the limitation “routed to the second node by the routing device, and returned therefrom through the predetermined connection path” should instead be “returned therefrom through the predetermined connection path, and routed to the second node by the routing device. Applicants amend claims 1 and 9 so that the limitation reads “and returned therefrom through the predetermined connection path after the routing device has determined the outgoing route data”, and respectfully request that the objection be withdrawn.

REJECTIONS UNDER 35 U.S.C. § 103

Claims 1 – 14 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Publication No. 2001/0056490 to Nagami et al. Applicants amend independent claims 5 and 9 to clarify the nature of their invention, and respectfully traverse this rejection.

In a Preliminary Amendment of April 22, 2004, Applicants made the following arguments:

In independent claims 1, 5, 9 and 12, Applicants disclose a packet transfer apparatus for switching and transferring a cell or frame signal between first and second nodes and a routing device. Applicants' claimed apparatus includes a switch, a memory and a shortcut controller. Applicants' shortcut controller dynamically caches outgoing route data transmitted by routing device to the second node over a predetermined connection path, and determines whether incoming cell or frame signals to the switch contain outgoing route information that matches to a outgoing route information cached in the memory.

If a match is found, the shortcut controller causes the switch to transfer the cell or frame signal from the first node to the second node via a shortcut and without routing the cell signal via the predetermined connection path to and from the routing device (see, e.g., page 8, lines 25 through 35 of Applicants' specification). If a match is not found, outgoing route data for the input cell is cached into the memory after being routed by the routing device through the predetermined connection path. Alternatively, Applicants' shortcut controller as claimed in claims 5 and 12 caches source data from input cells arriving at the second node for use as outgoing route information.

Nagami discloses a system for transferring IP packets over ATM networks via virtual connections, in which a router connecting two ATM networks has memory means for storing a correspondence between a virtual connection used in the network of a transmitting user and a virtual connection used in the network of the receiving user. The Examiner compares elements 203 – 206 of Nagami's router (FIG. 4) to Applicants' shortcut controller, and elements/process steps t2, t3 of Nagami's router to Applicants' cached memory.

However, Applicants' shortcut controller and memory are not router elements in a router comparable to the router disclosed by Nagami, but are rather adjuncts of a switch 5 that allow switch 5 to perform shortcut processing without routing a cell signal via the predetermined connection path to and from the routing device. In order to accomplish this, Applicants' shortcut controller and memory effectively detect and store outgoing route data transmitted by the router to the second node over the predetermined connection path, and forward packets along the router-identified routes without again directly accessing the router over the predetermined connection path in order to obtain this route data.

In addition to this fundamental architectural difference between the system of Nagami and Applicants' claimed invention, several other aspects of Applicants' claimed bypass process can be distinguished from the system disclosed by Nagami.

As illustrated in FIG. 7 of Nagami, routing tables for L3 processing (tables t2 to t4) are used for routing of frames and packets between nodes, for example, via dedicated virtual channels. The routing tables are updated by messaging (e.g., bypass pipe setup and bypass pipe release messages) between adjacent routers (see, e.g., FIG. 13 of Nagami).

In sharp contrast, Applicant's claimed invention monitors information for cells routed by the router associated with Applicants' switch, and dynamically caches associated information identifying output connection IDs produced by the router with a corresponding cell or frame information. Unlike the system of Nagami, standard cache algorithms employed by Applicants' claimed invention keep data current in the cache without the need for more complex messaging, and no frame assembly is needed to form L3 packets in order to determine next hop routing. As a result, bypass routing can be executed much more quickly and directly.

Nagami fails to disclose or suggest caching connection information, and in particular as claimed in Applicants' claims 5 and 12, caching output route information for cells or frames as determined from input cell signals directed from a destination node to the second node.

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Applicants note that the process of Nagami referenced by the Examiner for establishing a switched bypass path (paragraph 369, Figure 40) is one in which the router establishes a VC for a next hop to a next stage router upon determining that an arriving packet is not associated with a bypass path. While FIG. 47 of Nagami discloses a procedure by which a transmission terminal 602 performs routing of a data packet with reference to a destination management table 629 and without immediate reference to a router, unlike Applicants' claimed cell signal switching apparatus, the terminal 602: (a) does not include a switch that has a fixed or semi-fixed predetermined connection to a router, (b) does not cache data received from a second node and transmitted to the switch from the router via this path, and (c) does not then have means for subsequently using the cache data to form a shortcut for transmitting a cell signal to the second node without routing the cell signal via the router.

As FIG. 4 of Nagami illustrates a configuration of each router in the disclosed network, it does not in comparison to Applicants' claimed cell signal switching apparatus include the combination of a switch coupled via a predetermined connection path to a router, wherein the switching apparatus in addition includes a memory and a shortcut controller. Rather, FIG. 4 of Nagami simply illustrates components configured in the router. Thus, unlike Applicants' claimed apparatus, the components of FIG. 4 do not provide means for bypassing routing of cell signals to the router.

The Examiner finds these arguments unpersuasive, suggesting that Nagami's router includes a shortcut controller (items 203 – 206 of FIG. 4) and memory (items S2, T1 and S6) that serve as an adjunct to a switch (item 202 of FIG. 4). The Examiner further suggests that Nagami's router dynamically caches outgoing routing data as layer 2 output data determined from a layer 3 analysis (step S11 of FIG. 7). The Examiner also suggests that the network layer switch in FIG. 4 of Nagami is fixedly connected to the datalink switch of FIG. 4, and that FIG. 7 of Nagami shows caching of data from input cell signals received from the second node as outgoing route data without accessing routing elements. Applicants respectfully disagree.

Applicants respectfully submit that items 203 – 206 of FIG. 4 are more properly compared to the routing device connected to the claimed cell signal switching apparatus rather than to Applicants' claimed shortcut controller. If a comparison to the shortcut controller is none-the-less made, Nagami then fails to disclose in addition a routing device connected over a predetermined path to the switch 202 such that routing data from the routing device is cached in a memory by a shortcut controller. In other words, unlike Applicants' claimed invention, Nagami fails to disclose a shortcut controller that serves as an adjunct both to the routing device and to the switch for caching routing information determined by the router in a cache memory of the switch.

With reference to step S11 of FIG. 7, the Examiner suggests that Nagami discloses dynamically caching outgoing routing data as layer 2 output data determined from a layer 3 analysis (steps S11, S12 of FIG. 7). While Nagami discloses in paragraph 175 that an L2 frame is converted from an L3 packet, Applicants respectfully submit that

Nagami provides no explicit indication that a resultant L2 address is in anyway cached as a result of the conversion.

With reference to Applicants' independent claims 5 and 12, the Examiner suggests that FIG. 7 of Nagami shows caching of data from input cell signals received from the second node as outgoing route data without accessing router elements. However, while Nagami discloses forming bypass pipes for transmitting packets without network layer routing, Applicants' amended independent claims 5 and 12 recite caching source data "from an input cell[/frame] signal received from [a] second node", without routing analysis by the router (see, e.g., page 9, lines 3 – 9 of Applicants' specification and amended claims 5 and 12). In other words, Nagami fails to disclose Applicants' claimed element that caches source data from packets arriving from a second destination node without any routing analysis by the router.

Accordingly, Applicants' respectfully submit that independent claims 1, 5, 9 and 12 are not made obvious by Nagami, and therefore stand in condition for allowance. As claims 2- 4, 6 – 8, 10 – 11 and 13 – 14 respectively depend from allowable claims 1, 5, 9 and 12, Applicants respectfully submit that claims 2- 4, 6 – 8, 10 – 11 and 13 – 14 stand in condition for allowance for at least this reason.

CONCLUSION

An earnest effort has been made to be fully responsive to the Examiner's objections. In view of the above amendments and remarks, it is believed that claims 1 – 14, which include independent claims 1, 5, 9 and 12 and the claims that depend therefrom, stand in condition for allowance. Passage of this case to allowance is earnestly solicited. However, if for any reason the Examiner should consider this

application not to be in condition for allowance, he is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

Any fee due with this paper may be charged on Deposit Account 50-1290.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'T. Bean', is written over a horizontal line.

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